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### (54) CUSHION DEVICE

#### (57)Abstract:

PROBLEM TO BE SOLVED: To provide a cushion device capable of preventing a partition wall of a peripheral part from being deformed toward a central part when forming a cushion body of thin partition wall for weakening repulsion.

SOLUTION: This cushion device is provided with a cushion body 2 having the thin partition wall formed in a grating shape by an elastic material a reinforcing member 11 formed in a frame shape and arranged over the full length of an outer peripheral surface of the cushion body a belt-shape member 14 for integrally holding this reinforcing member in the cushion body a first recessed part 16 of a side part elastic material and an out-fitting base 18 for covering the cushion body.

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### CLAIMS

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#### [Claim(s)]

[Claim 1] A cushion body in which a septum of thin meat was formed in the shape of a lattice of a spring material A cushion device possessing a reinforcing member which was formed in frame shape and provided covering an overall length of a peripheral face of the above-mentioned cushion body holding mechanism which held this reinforcing member in one to the above-mentioned cushion body and an exterior place which covered the above-mentioned cushion body.

[Claim 2] The cushion device according to claim 1 which the above-mentioned holding mechanism is a strip member and is characterized by winding this strip member around a septum located in a peripheral face of the above-mentioned

cushion body and a reinforcing member provided in a peripheral face of this septum.

[Claim 3] The above-mentioned cushion body is divided into two or more blocks formed of a rectangular frame shape outside partition and an inside septum provided in the shape of a lattice in this outside partition and these blocks as if a mutual outside partition is joined both. The cushion device according to claim 1 wherein an end of a sliding direction of the joining section is combined by coupling means in one.

[Claim 4] The cushion device according to claim 1 wherein a flank elastic material is formed in a peripheral face of the above-mentioned cushion body covering an overall length.

[Claim 5] The cushion device according to claim 4 wherein the above-mentioned holding mechanism is a crevice where the above-mentioned reinforcing member which was formed in inner skin of the above-mentioned flank elastic material and was provided in a peripheral face of the above-mentioned cushion body is engaged.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the cushion device which carries out suitable to the mattress for bed set etc.

[0002]

[Description of the Prior Art] For example in the mattress for beds which is a cushion device the function which supports a human body elastically i.e. good cushion performance is required without spoiling comfortable feeling in bed.

[0003] The above-mentioned mattress has a cushion body laminates a sheet shaped elastic material to the upper and lower sides of this cushion body covers this layered product with an exterior place and is constituted. As the above-mentioned cushion body a spring unit is used in many cases. A spring unit connects many coil springs with matrix form by a helical line and is formed.

[0004] If the compression set of the coil spring is carried out in response to a user's load in the case of the mattress which formed the cushion body with the coil spring Since repulsive force is produced according to the deformation the body is pressed and the user who lay on the back on the mattress according to the repulsive force may say that comfortable feeling in bed is spoiled.

[0005] Forming the above-mentioned cushion body with gelling material instead of a coil spring is proposed. The cushion body formed with gelling material Since it had high calorific capacity and efficient heat transfer in the state where it might say that a feel was cold might say that a manufacturing cost became higher it was restrained further it might be said that there was a thing like there is no cushioning power and it was hardly suitable for forming a cushion body.

[0006] Then solving the problem mentioned above by forming the pillar of two or more caves surrounded by the septum by the cushion body formed with gelling

material is performed as shown in the US5749111B Description.

[0007]

[Problem(s) to be Solved by the Invention]By the wayif load is receivedthe septum surrounding a cave will deform by flexion the cushion body which consists of gelling material in which the pillar of two or more caves was formed. If the whole septum is crooked in a similar manner as for a cushion bodythere will be no problem in particularbut the septum corresponding to a portion with a user's heavy body is usually crooked more greatly than other portions. That isthe septum of the center portion of the cushion body corresponding to a user's hip or regions of back deforms by flexion more greatly than the septum of a peripheral part.

[0008]Thereforein order for a cushion body to change into the state where the septum of a peripheral part is pulled toward a center portionthere is a thinglike give a user displeasure by motion of the septum of the peripheral partor modification of the outline shape of a cushion body becomes large.

[0009]Even if this invention receives load with a bigger center portion of a cushion body than a peripheral partthere is a septum of a peripheral part in providing the cushion device carried out to be hard to produce the modification pulled toward a center portionand be.

[0010]

[Means for Solving the Problem]A cushion body in which a septum of thin meat was formed in the shape of a lattice of a spring material as for an invention of Claim 1It is in a cushion device possessing a reinforcing member which was formed in frame shape and provided covering an overall length of a peripheral face of the above-mentioned cushion bodyholding mechanism which held this reinforcing member in one to the above-mentioned cushion bodyand an exterior place which covered the above-mentioned cushion body.

[0011]The above-mentioned holding mechanism of an invention of Claim 2 is a strip memberand this strip member is in the cushion device according to claim 1 currently winding around a septum located in a peripheral face of the above-mentioned cushion bodyand a reinforcing member provided in a peripheral face of this septum.

[0012]An invention of Claim 3 the above-mentioned cushion body A rectangular frame shape outside partitionAre divided into two or more blocks formed of an inside septum provided in the shape of a lattice in this outside partitionand these blocks as if a mutual outside partition is joined bothIt is in the cushion device according to claim 1wherein an end of a sliding direction of the joining section is combined by coupling means in one.

[0013]The cushion device according to claim 1wherein a flank elastic material is formed in a peripheral face of the above-mentioned cushion body covering an overall length has an invention of Claim 4.

[0014]The above-mentioned holding mechanism has an invention of Claim 5 in the cushion device according to claim 4 being a crevice where the above-mentioned reinforcing member which was formed in inner skin of the above-mentioned flank elastic materialand was provided in a peripheral face of the above-mentioned

cushion body is engaged.

[0015]According to this invention since a peripheral face of a cushion body is reinforced by a reinforcing member a septum of a peripheral part becomes not easily pulled by modification of a septum of a center portion toward a center portion.

[0016]

[Embodiment of the Invention] Hereafter this embodiment of the invention is described referring to Drawings.

[0017]Drawing 1 showed the mattress 1 for the beds as a cushion device and this mattress 1 is provided with the cushion body 2. This cushion body 2 is divided into two or more blocks 3. According to this embodiment as shown in drawing 1 thru/or drawing 3 the cushion body 2 is divided into nine blocks 3.

[0018]The above-mentioned block 3 is constituted by the outside partition 4 formed in rectangular frame shape with spring material such as an elastomer and the inside septum 5 provided in the shape of a lattice in this outside partition 4. Injection molding of this block 3 is usually carried out.

[0019]The shape of a lattice is 50–300 mm in height of the inside septum 5 and 20–200 mm in width of the inside septum 5. The thickness of each septa 4 and 5 is 1.5–3 mm preferably 0.5 mm – 5 mm. Even if it makes a septum thin using an elastomer with high hardness and thickens a septum using an elastomer with hardness low on the contrary when you sleep natural cushioning properties are lost. In order to take out soft natural cushioning properties without carrying out bottoming to the weight of a human body the hardness of an elastomer and the thickness of a septum serve as an important element. Considering this viewpoint it is good to use the elastomer of Shore A25 – the hardness of 35 for a septum and for the thickness of the septa 4 and 5 to be 1.5–3.0 mm.

[0020]The elastomers used by this invention are thermoplastic elastomer and rubber. Although the action of the thermoplastic elastomer is carried out as a rubber-like elasticity object at ordinary temperature it is a substance which carries out presentation modification by a rise in heat. As thermoplastic elastomer polystyrene system thermoplastic elastomer Polyolefin system thermoplastic elastomer polyvinyl chloride system thermoplastic elastomer Thermoplastic elastomer polyester polyurethane system thermoplastic elastomer Thermoplastic elastomer polyamide thermoplastic 12-polybutadiene fluorocarbon rubber system thermoplastic elastomer chlorinated polyethylene system thermoplastic elastomer dynamic-bridge-formation thermoplastic elastomer etc. are mentioned.

[0021]Crude rubber and a synthetic rubber are used as rubber. As a synthetic rubber polybutadiene rubber polyisoprene rubber styrene butadiene rubber butadiene acrylic nitrile rubber isobutylene rubber etc. are mentioned.

[0022]Especially polystyrene system thermoplastic elastomer is rich in pliability among the elastomers mentioned above and since endurance is good it is desirable although the cushion body 2 is formed.

[0023]Two or more above-mentioned blocks 3 join the adjacent outside partition

4 and are arranged as the upper-and-lower-ends part of the portion which the outside partition 4 joined mutually shows drawing 2 and drawing 5 the connecting lock is carried out with the U character-like clip 6 as a coupling means. Nine blocks 4 are combined in one by it.

[0024] The elastic sheet 10 of bigger rectangular shape than the plane shape of this cushion body 2 is joined to the upper and lower sides of the above-mentioned cushion body 2. This elastic sheet 10 is formed with spring materialssuch as urethane foam.

[0025] The reinforcing member 11 is formed in the peripheral face of the above-mentioned cushion body 2 covering the overall length of this peripheral face. This reinforcing member 11 connects with rectangular frame shape each neighborhood of the cushion body 2 and the both ends of the four rectangular pipes 12 formed in corresponding length with the L character-like splice 13 respectively and is constituted by metalthe hard synthetic resinetc.

[0026] And the rectangular pipe 12 which the reinforcing member 11 joins to the peripheral face of the cushion body 2 It is held in the predetermined height position of the peripheral face of the cushion body 2 by the strip member 14 as the 1st holding mechanism of the resin tape wound around the outside partition 4 of each block 3 located in the periphery of the cushion body 2 a stringetc.

[0027] As each rectangular pipe 12 of the reinforcing member 11 is shown in drawing 3 three places are held by the strip member 14 at the cushion body 2 respectively. The flank elastic material 15 is formed in the peripheral face of the above-mentioned cushion body 2 covering the hoop direction overall length. With materialssuch as urethane foam sectional shape is rectangular shape and as for height measurement this flank elastic material 15 is formed almost similarly to the cushion body 2.

[0028] The 1st crevice 16 of the shape of a rectangular cross section as the 2nd holding mechanism that the above-mentioned reinforcing member 11 enters as shown in drawing 4 (a) and the 2nd crevice 17 of section about 3 rectangular shape that the above-mentioned strip member 14 enters as shown in drawing 4 (b) are formed in the inner skin of this flank elastic material 15.

[0029] By it if the flank elastic material 15 is formed in the peripheral face of the cushion body 2 Since the reinforcing member 11 provided in this peripheral face enters the 1st crevice 16 of the flank elastic material 15 and the strip member 14 enters the 2nd crevice 17 the peripheral face of the cushion body 2 can be made to join the inner skin of the flank elastic material 15.

[0030] And this reinforcing member 11 is certainly held in the predetermined height position of the peripheral face of the cushion body 2 because the reinforcing member 11 enters the 1st crevice 16 of the flank elastic material 15. That is when the reinforcing member 11 is held only by the strip member 14 the outside partition 4 around which the above-mentioned strip member 14 was wound by the weight of the reinforcing member 11 may be crooked but. The weight of the reinforcing member 11 is prevented from being directly added to the outside partition 4 by making the reinforcing member 11 engage with the 1st crevice 16 of the flank

elastic material 15.

[0031] Although it is also good to install the above-mentioned flank elastic material 15 in the peripheral face of the cushion body 2, inner skin is pasted up on the outside partition 4 of each block 4 located in the peripheral face of the cushion body 2 and it may be made to paste up the upper and lower sides on the periphery of the elastic sheet 10. Furthermore, it may unite with adhesion by a means besides instead of. According to this embodiment, adhesion fixing of the inner skin of the flank elastic material 15 is carried out to the peripheral face of the cushion body 2 and adhesion fixing of the upper and lower sides is carried out to the periphery of the elastic sheet 10 and they are united with it.

[0032] The unit which consists of the above-mentioned cushion body 2, the elastic sheet 10 and the flank elastic material 15 is covered with the exterior place 18. This exterior place 18 is established in the peripheral face of upper \*\*\*\* 18a provided in the upper surface of the above-mentioned cushion body 2 as shown in drawing 1 and drawing 2, the lower mirror place 18b established in the undersurface and the flank elastic material 15, and it has the ground 18c, this — it waits and comes to sew the edge part of each above-mentioned \*\*\*\* 18a and 18b on the upper and lower ends of the ground 17C.

[0033] Although not illustrated, the mesh of the flexible structure made of a synthetic resin may be provided between the upper surface of the cushion body 2 and the flank elastic material 11 and the elastic sheet 10.

[0034] If a user lies on the back on the mattress 1 constituted in this way, the outside partition 4 and the inside septum 5 of each block 3 which constitute the cushion body 2 according to a user's load will deform by flexion.

[0035] The load added to the cushion body 2 is not uniform and the load added to the portion corresponding to a user's hip or regions of back, i.e. the center portion of the cushion body 2 becomes larger than the load added to a peripheral part. The direction of the septum located in a center portion rather than the septa 4 and 5 located in a peripheral part by it among the septa 4 and 5 of each block 3 which constitutes the cushion body 2 will deform by flexion greatly.

[0036] If the septa 4 and 5 of a center portion deform by flexion more greatly than the septa 4 and 5 of a peripheral part, it not only is going to change into a sliding direction but the septa 4 and 5 of a peripheral part tend to change also in the direction which goes to the center portion of the cushion body 2.

[0037] However, the reinforcing member 11 held in one in the peripheral face is formed in the peripheral face of the cushion body 2. Therefore, even if the septa 4 and 5 of the center portion of the cushion body 2 deform by flexion greatly, it is prevented that the septa 4 and 5 of a peripheral part change toward the center portion of the cushion body 2 by the reinforcing member 11.

[0038] That is, even if the load of the mattress 1 added to the center portion and peripheral part of this mattress 1 is uneven, although changed into a thickness direction according to load, it hardly changes into horizontally that thickness direction is intersected, especially horizontally it goes to a center portion from a peripheral part. As a result, the thing of giving displeasure to the user who lay on

the back on the mattress 1 or the outline shape of the mattress 1 changing greatly can be prevented.

[0039] The above-mentioned reinforcing member 11 is certainly held by the strip member 14 and the 1st crevice 16 of the flank elastic material 15 at the height direction halfway part of the cushion body 2. Therefore since the reinforcing member 11 will reinforce the peripheral face of the cushion body 2 certainly reinforcement of the periphery of the cushion body 2 by this reinforcing member 11 will also be ensured.

[0040] The reinforcing member 11 is held at the height direction halfway part of the peripheral face of the cushion body 2. Therefore since the hardness of the reinforcing member 11 does not get across to the user who lay on the back on the mattress 1 easily it can prevent giving a user displeasure. If a user gets down from on the mattress 1 the septa 4 and 5 in the state where the cushion body 2 was crooked according to the stability of the flank elastic material 15 will be returned to the original state. That is each block 3 of the cushion body 2 is considered as the composition which formed the inside septum 5 in the shape of a lattice in the outside partition 4 of frame shape in order to weaken the repulsive force given to a user.

[0041] Therefore even if it removes the load added to the mattress 1 compared with the spring material of a spring or inner substance it is hard to restore each septa 4 and 5 to the original shape but it is easy to return to the original state according to the stability of the flank elastic material 15 provided in the periphery of the cushion body 2.

[0042] By having formed the flank elastic material 11 covering the overall length of the peripheral face of the cushion body 2 since the upper surface can be used effectively the effective use area of the mattress 1 is expandable.

[0043] When the stability of the flank elastic material 11 is large the stability will press the body of the user who lay on the back on the mattress 1. Therefore if the elasticity (hardness) of the flank elastic material 11 is suitably set up with expansion ratio etc. while being able to restore the cushion body 2 deformed by flexion certainly it can be made the elasticity which does not press a user's body strongly.

[0044] The above-mentioned cushion body 2 is divided into two or more blocks 3 and these blocks 3 were connected with the U character-like clip 6. Therefore since the block 3 can fabricate the cushion body 2 with a small metallic mold compared with the case where it is considered as one mold goods it can perform the manufacture easily and cheaply.

[0045]

[Effect of the Invention] According to this invention the septum of thin meat provided the reinforcing member of frame shape in the peripheral face of the cushion body formed in the shape of a lattice covering the overall length as mentioned above.

[0046] Therefore since the peripheral part of the cushion body is reinforced by the reinforcing member even if the septum of the center section of a cushion body

deforms by flexion greatly compared with the septum of a peripheral part the septum of the peripheral part can be prevented from changing toward a center section.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The perspective view in which the mattress in which the 1 embodiment of this invention is shown carried out the partial section.

[Drawing 2] Drawing of longitudinal section of a mattress.

[Drawing 3] The top view of a cushion body.

[Drawing 4] (a) and (b) are sectional views of a portion where flank elastic materials differ respectively.

[Drawing 5] The perspective view showing the joining structure of the outside partition of an adjacent block.

[Description of Notations]

2 -- Cushion body

3 -- Block

4 -- Outside partition

5 -- Inside septum

6 -- U character-like clip (coupling means)

11 -- Reinforcing member

14 -- Strip member

15 -- Flank elastic material

16 -- The 1st crevice

18 -- Exterior place

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